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Notes of a naturalist afloat—II

WILLIAM EDWIN SAFFORD

(PLATE I)

THE FLORIDA KEYS

The Florida Keys are a chain of low islands extending around the southern extremity of the peninsula from Cape Florida to the group known as the Dry Tortugas. They are in reality a continuous coral reef and have been recently connected with the mainland by a railroad with a terminus at Key West.* The word "key", applied to these small islands, is a corruption of the Spanish "cayo," which still persists in the name of Cayo Largo. The name of Key West was originally Cayo Hueso or "Bone Key." From a biological point of view these islands are essentially West Indian instead of a part of the United States. They are important stations for the student of marine pelagic life, since they lie on the margin of the great Gulf Stream, which bears to their shores myriads of beautiful and interesting living organisms, many of which are still unknown to science.

On our arrival at Key West, April 15, 1881,† we found there Mr. Alexander Agassiz, who had just returned from the Dry Tortugas, where, with his associate Mr. J. Walter Fewkes, he had been spending some time for the purpose of studying Gulf Stream life. They had done some

* This road was completed in January 1912.

† The date of our departure from Aspinwall was April 9th, instead of March 9th, as stated in my preceding paper.



A KEY WEST RESIDENCE ENHANCED IN COCONUT PALMS
Photograph by Guy N. Collins

interesting work, including the completion of colored drawings of the Portuguese man-of-war and other related forms of surface life; but the stiff northern winds, which we had encountered on our way from Aspinwall, had driven the great stream to the southward of its usual course, and they were not so successful in their investigations as they had hoped.

When Mr. Agassiz found that I was interested in natural history, he earnestly advised me to forsake botany and all other branches that could be studied as easily by investigators living on shore, and to devote myself specially to the study of the surface life of the ocean; since so great a part of my life was to be spent upon it, and I would consequently have unusual opportunities for such work. I was much impressed by his enthusiasm, and I resolved to do as he advised. Before we left he sent me a list of books which he suggested that I buy as a nucleus of a working library, mostly works on the anatomy of marine invertebrates; and he added some practical directions for collecting surface material by means of a tow-net from the decks of a ship and for the preservation of living animals for study.

At this time I did not realize the difficulties which the serious study of natural history on board a man-of-war would entail. Collecting of curios is tolerated on board ship: many seagoing men bring home from their cruises portfolios of ferns or seaweeds, cases of butterflies or hummingbirds, and cabinets of coral and seashells; but, somehow, the study by a naval officer of a subject so foreign to his profession as natural history was considered out of place. It had better be left to the ship's doctor or perhaps to the chaplain, if he should have a taste for it. The knowledge of an average naval officer of biology may be illustrated by referring to two subjects of debate which I heard in the ward room of the *Powhatan*. The first was: "Is a whale a fish or an animal?" and the second

"What is a tomato, a fruit or a vegetable?" This is not surprising since no branch of biological science is included in the curriculum of the Naval Academy; and a midshipman may graduate without the slightest notion of what an animal or a plant is or of the general rudiments of botany and zoology, the formation of coral islands, the causes of ocean currents, or other kindred subjects.

Darwin, in his letters, speaks of the attitude of the officers of the *Beagle* toward his work while he was attached to that vessel as naturalist. The executive officer, or first lieutenant, he says, referred to his collections as "beastly devilment," and declared: "If I were skipper, I would soon have you and all your d—d mess out of the place."* Huxley encountered the same spirit on board the *Rattlesnake*. "The singular disrespect with which the majority of naval officers regard everything that lies beyond the sphere of routine," he writes, "tends to produce a tone of feeling very unfavorable to scientific exertions."

It was in consequence of my talk with Mr. Agassiz that I resolved to fit myself for scientific collecting on my future cruises; and I was afterwards sent to Yale University and the laboratory of the U. S. Fish Commission at Woods Holl with this object in view, chiefly through the influence of Professor Charles E. Munroe, Rear Admiral C. R. P. Rodgers, Rear Admiral John G. Walker, who was Captain of the *Powhatan* during part of my tour of duty on board her, and Rear Admiral Bowman H. McCalla, who was at this time our executive officer. I shall describe later how I tried to carry on serious work in natural history during a subsequent cruise, and how I was fired from my laboratory by the skipper, together with all my "d—d mess."

During the stay of the *Powhatan* at Key West and on several subsequent visits, I made a few notes on the vege-

* Darwin, Francis. Life and letters of Charles Darwin 1: 196. 1898.

tation of this island and the adjacent keys, and I afterwards amplified my notes by examining material in the U. S. National Herbarium at Washington. In the herbarium, I found plants from this region collected by Dr. Edward Palmer, Mr. A. H. Curtiss, Mr. Charles T. Simpson, and Mr. Guy N. Collins, who on an expedition to the Keys, in 1898, was accompanied by Messrs. C. L. Pollard and E. L. Morris.

In the town of Key West the most striking feature of the vegetation is the coconut palm (*Cocos nucifera*), groves of which embower residences of the better class and in places fringe the snow-white seabeach. Most of the ornamental plants I saw here were introduced species commonly found in tropical cities: scarlet-flowered *Hibiscus rosa-sinensis*; large oleanders with white, pink, and crimson flowers; *Thevetia nerifolia*, sometimes called the "yellow oleander," with golden yellow funnelshaped flowers, narrow leaves, and peculiar fruits, shaped like an inverted cocked hat; *Plumeria rubra* sometimes called "frangipanni," with clusters of large jasminelike white or rose-tinted flowers borne at the end of clumsy thick branches; a shrubby trumpet flower, *Tecoma stans*, which I had already noticed at Panama; the showy "flower fence" (*Poinciana pulcherrima*), belonging to the Caesalpiniaceae, with loose clusters of flowers having clawed petals variegated with red and yellow; several mimosa-like shrubs including the sweet-scented *Acacia farnesiana*, with small fluffy yellow heads of flowers, and the pink-flowered *Albizia julibrissin*; and a bush with small variegated pink and white leaves, which I afterward saw growing in hedges at Honolulu, and which proved to be *Phyllanthus roseapicta*.

Among the trees were several specimens of *Terminalia catappa*, with branches radiating in regular whorls from the straight upright trunk, leathery leaves, and almond-like nuts; the mournful-looking ironwood, *Casuarina*

equisetifolia, which I afterwards found so common on islands of the tropical Pacific; a banyan tree (*Ficus* sp.) with aerial roots, growing in the arsenal yard; a few small trees of the Chinaberry (*Melia azedarach*) with clusters of small violet-colored, or lavender flowers; and the so-called Jerusalem thorn (*Parkinsonia aculeata*), belonging to the Caesalpiniaceae, with clusters of bright yellow flowers and pinnate leaves with broad grasslike rachis and minute deciduous leaflets. In addition to these there was a rough-leaved tree I had never seen before, with clusters of flame-colored, petuniashaped flowers. This proved to be *Cordia sebestena*, belonging to the Boraginaceae. It was known at Key West as the "geiger tree," and its fruit was called "geiger berries." There were also a number of variegated crotons and Acanthaceae, and a few amaryllids growing in pots. But among the most showy of all the ornamental plants I saw, were two species of *Bougainvillea* which climbed over balconies and bowers. The first was the species most commonly seen in the tropics, with bright magenta bracts (*Bougainvillea glabra*), and the second a variety of *Bougainvillea spectabilis* with brick-red bracts and a less robust habit of growth, sometimes called *B. lateritia* by florists. I shall now try to give some idea of the spontaneous vegetation of the Florida Keys.

Ferns are not abundant. Perhaps the most interesting species is *Aneimia adiantifolia*, which grows on coral rock often among pine trees, as on No Name Key. Its fronds suggest those of certain Davallias I afterward collected in Polynesia, but its fruit is confined to two lower pinnae, which are especially modified like those of an *Osmunda*. Associated with it, *Pteris longifolia* is often found, and on certain palmettos the epiphytal sword fern, *Nephrolepis exaltata*, sometimes occurs, though this species is more common on the mainland.

Other ferns found on the keys are *Pteris caudata*,

sometimes regarded as a variety of the common *P. aquilina*; *Polypodium phyllitidis*; *P. polypodioides*; *Phymatodes exiguum* Und. (*Polypodium Swartzii* Baker), common on Cayo Largo, where it climbs over bushes; *Paltonium lanceolatum*, growing on trees, on old Rhodes Key; and on the shores of Biscayne Bay, at the eastern extremity of the Keys, occur all the species mentioned above together with *Dryopteris thelypteris* and *D. patens*.

The only conifer is *Pinus heterophylla*, also known as the Cuban pine, which is also found on the Bahama Islands. On the keys it is associated with *Thrinax microcarpa* and other palmettos.

Some of the palmettos are stemless or nearly so, as in the case of *Coccothrinax Garberi*, which grows along the shores of Biscayne Bay. Others have tall slender trunks and crowns of round fanshaped leaves, as in *Coccothrinax jucunda*, the blades of which are silvery white beneath and yellowish green above with orange-colored ligule at the base. The drupes of *Coccothrinax* are dark purple or blackish, while those of the genus *Thrinax* are white. The most common *Thrinax* is *T. microcarpa* with flowers, like those of *T. keyensis*, borne on disclike pedicels. The latter species is characterized by a large base of matted roots which raises the foot of the trunk above the surface of the ground. *Thrinax floridana* is distinguished by fragrant, aromatic flowers borne on slender pedicels. It has a slender somewhat tapering trunk partially clothed with the persistent bases of the old leaves.

On several of the keys occurs *Agave decipiens*, a plant of an apple-green color resembling *Aloe vera* but useless except for its saponaceous roots. It should not be confused with the valuable *Agave sisalina*, which was introduced into southern Florida about the year 1834 by Dr. Perrine, the United States Consul at Campeche. Mr. Lyster H. Dewey of the Bureau of Plant Industry, who

went, in 1910, to Sugarloaf Key for the purpose of transplanting plants of *A. sisalina*, introduced upon that island several other useful fiber plants, including *Agave zapupe* from eastern Mexico and *Furcraea cabuya* from Costa Rica. The bulbules of *Agave decipiens*, which resemble those of *A. sisalina*, have sometimes been sold to unsuspecting colonists for those of the true fiber-producing Sisal.

The mangroves are perhaps the most important agent in land formation on the Florida Keys. I have already referred to those of the Isthmus of Panama. The accompanying figure of *Rhizophora mangle*, reproduced from a photograph by Mr. Guy N. Collins, shows the beginning of an islet near Sugarloaf Key and illustrates in a striking manner how the arched roots can collect floating debris borne by the currents, like the teeth of a great comb. This material in time becomes black mud and offers an inviting foothold for the various plants usually found associated with the mangroves.

In addition to *Rhizophora mangle*, several other mangrovelike plants occur on the keys, but none of them have the peculiar arched roots which characterize this species. *Conocarpus erectus*, the "button mangrove," can be recognized by its small alderlike cones. *Laguncularia racemosa* has peduncled spikes of small tubular flowers, leathery ribbed fruit, fleshy and veinless leaves bearing a pair of glands on the petiole. This is usually called the white mangrove, to distinguish it from *Avicennia nitida*, the black mangrove, which I saw growing near Aspinwall. The flowers of the black mangrove are so rich in nectar that the bee keepers of eastern Florida transport their hives to the coast at the time of its blooming, and "black mangrove honey" obtained in this way is among the finest honeys of the market and commands a fancy price.

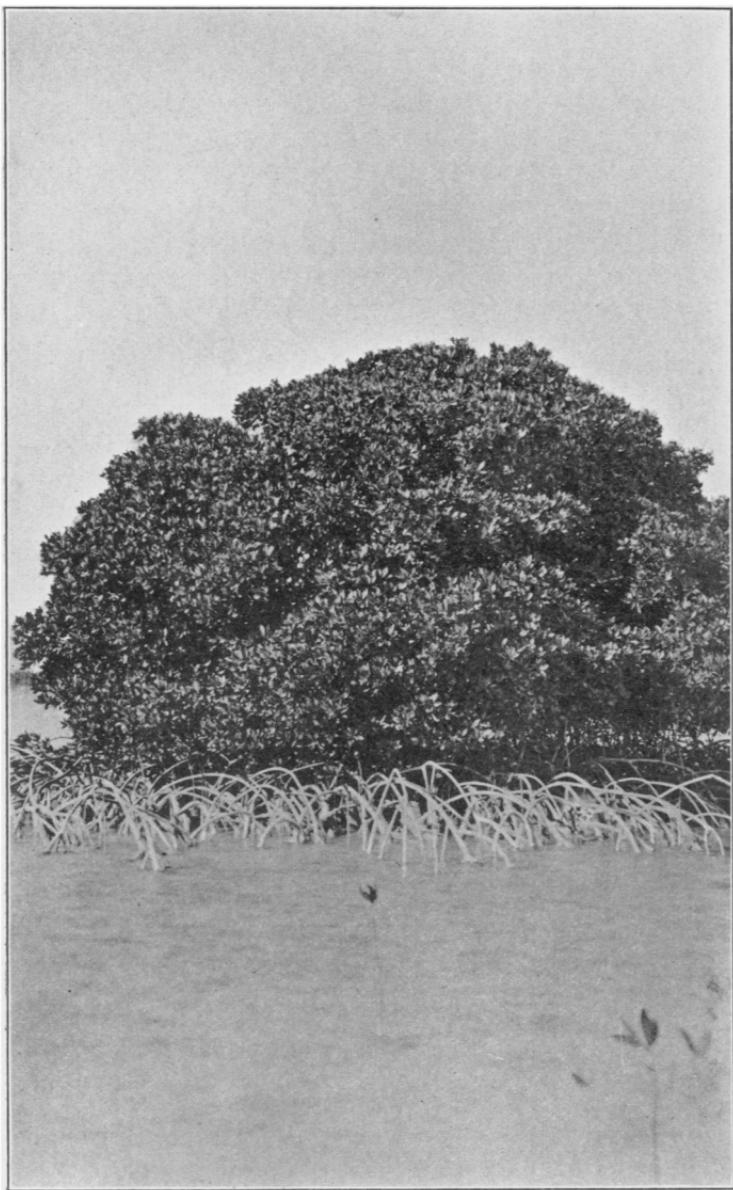
Among the shrubs growing spontaneously at Key West

are *Randia aculeata*, belonging to the Rubiaceae, sometimes called the inkberry, with clustered spatulate leaves and jasmineshaped flowers; *Bursera simaruba*, sometimes called "gombo limbo," a corruption of "goma elemi," one of its Spanish names, so called from the aromatic masticlike gum derived from it; *Mimusops Sieberi*, locally known as the wild sapodilla, or naseberry (Spanish "nispero," medlar) a plant with beautiful, finely featherveined leaves; and the poisonous sumac, *Rhus metopium*, which bears red berries.

Many of the strand plants are common tropical species of wide distribution. Among them are *Sesuvium portulacastrum*, often called seaside purslane; a seaside bean, *Canavalia obtusifolia*, with leathery trifoliolate leaves, often associated with the goatsfoot convolvulus (*Ipomoea pes-caprae*), which also spreads over the sandy beaches; *Guilandina crista* (*Caesalpinia bonduc* and *C. bonducella*), a scrambling shrub armed with recurved prickles and bearing broad prickly pods containing the hard stony gray or yellow spheroid seeds known as nicker nuts, so often seen in collections of "seabeans;" *Heliotropium parviflorum* and *H. curassavicum*, tropical weeds belonging to the Boraginaceae, with inconspicuous flowers; *Lippia nodiflora*, sometimes used for making lawns in situations where grass will not grow; and, climbing over bushes, a weak-stemmed plant bearing auricled leaves and flowers with blue stamens, which proved to be *Plumbago scandens*.

Among the composites are a shrubby *Baccharis* with resinous leaves; a coarse ragweed, *Ambrosia hispida*; a blue-flowered *Ageratum*; *Borreria frutescens*, a hispid plant with yellow-rayed heads; and *Parthenium hysterophorus* with pinnatifid leaves and with heads of flowers having a few broad white rays.

But there is not space here to give a complete list of the strand plants. Some of them belonged to genera represented by allied species on the Pacific islands. Thus



RHIZOPHORA MANGLE, the common mangrove, beginning an island.
Photograph by Guy N. Collins

Tournefortia gnaphaloides, belonging to the Boraginaceae, is represented in Polynesia by *T. argentea*; and *Scaevola Plumieri*, allied to the Lobeliaceae, with flowers having a peculiar 5-lobed corolla split down on one side, is represented there by *Scaevola Koenigii*; while *Maytenus phyllanthoides*, with leathery leaves and bright red three-valved seedpods, belongs to an interesting genus of Celastraceae, represented in the Straits of Magellan by *Maytenus magellanica*, and in the Galapagos Islands by *M. obovata*.

While at Key West, our fare was pleasantly varied with turtle meat, which was sold in the market like beef or mutton, and excellent fish of many kinds. The favorite of all the fishes both on account of its excellence for the table and the sport it affords to the fisherman is one allied to the Spanish mackerel and called the kingfish or sierra, *Scomberomorus cavalla*, which comes in immense numbers to the Florida Keys and is caught there from November till April. Its usual weight is about six to ten pounds, but it is often much larger. It is caught by trolling and is rivaled only by the tarpon in the estimation of the sportsman, but it is infinitely superior to the latter in the eyes of the epicure. Among other fine fish were the mangrove snapper or pargo prieto (*Neomaenius griseus*), which our men caught in great numbers over the ship's side, the mullet or liza (*Mugil curema*), and the beautiful spotted cabrilla (*Epinephelus guttatus*), which also affords good sport.

It was an interesting sight to stand on the edge of the wharf and look down into the clear water at the tetradons and other bright-colored and curiously variegated fishes nibbling at the barnacles and coral; and in the adjoining basin was an inexhaustible supply of mullets, snappers, and other food fishes.

There is not space here to describe the various types of mankind which form the population of Key West: the

Conchs, as the natives of the Bahama Islands, probably descendants of the old Buccaneers, are called; the Cuban cigar-makers, and the motley collection of negroes. Spanish is much spoken, and the language of the Bahama Islanders can scarcely be recognized as English when first heard.

At one shop kept by a Bahama woman and her daughter I saw some beautiful seashells, artificial flowers, and other objects made of shells, some of them quite pretty and others atrocious. Among the shells were great "king conchs" (*Strombus gigas*) with rough exterior and exquisitely polished rose-colored lining; "queen conchs" (*Cassis* sp.) which are also called helmet shells; pretty cone shells, olive shells, murices, and cowries. Of the bivalves, perhaps the most remarkable was the Venus-shell (*Cytherea dione*), specimens of which I had before seen at Aspinwall. In addition to these there were purple and orange-colored gorgonias or sea fans; corals of many kinds, staghorn coral, brain coral, mushroom coral, and other forms which had no names; dried starfishes and sea urchins; and sponges of many forms, some of which were like great goblets and others like cylindrical chimneys.

Under the eaves of many of the houses hung cages with birds of various kinds in them: cardinals, mockingbirds, and finchlike birds of several species. I bought a beautiful painted finch or "mariposa" (*Cyanospiza ciris*), the plumage of which was variegated with apple-green, scarlet, blue, crimson, and purple. This I carried home with me at the end of the cruise together with an indigo bird (*Cyanospiza cyanea*), which was blown on board the *Powhatan* during our passage from Aspinwall to Key West. It is interesting to note that the latter was greeted on the morning after his arrival in southern Ohio by birds of his own species, a pair of which had their nest in a neighboring orchard. So eager was he to join them that

his owner opened the door of the cage and set him free. Whether he ever returned to his new home after having migrated southward, or whether he found his way back to the Bahama Islands from which he had probably been blown, I do not know; but I do know that he was a happy little bird when he escaped from his confinement, and as if trying to express his gratitude he perched on a limb near the house and sang a little song of joy.

The Colorado Desert for ferns

F. T. PEMBER

As most people know, the Colorado Desert is mostly in California but takes its title from the great river of that name, which forms the eastern boundary of the state. It is over 200 miles long, extending from Banning on the north, not only to but far beyond the Mexican line on the south. Its thousands of square miles of hills and valleys, drifting sand dunes, and black lava rocks, are in most part as utterly barren and lifeless as anything on earth, though in places creosote bushes, greasewood, various cactuses, and other desert plants grow here and there and with the daily mirage lend interest amid the general desolation. The scant rainfall of $2\frac{1}{2}$ to 3 inches yearly is what makes the region a desert. It is hot in winter but worse in summer, with an almost unbearable temperature of 115° to 118° F. in the shade. The last place in the world to look for ferns, you will say. So it is, and none exist in the open desert. But on its western side the San Jacinto Mountains rise to a height of 11,000 feet, are covered in part with pine forests, and hold the winter's snow most of the year. When the snow melts, it sends clear cold streams down each rocky canyon, only to be lost in the desert sands. At the base of these mountains is a level tract of desert land of some 10,000